Claims.

We claim:

1. A submerged entry nozzle for use in the continuous casting of liquid metal, the nozzle comprising:

    a) a body having a central bore through most of the body, the bore terminating in a closed end;

    b) a plurality of pairs of discharge outlets symmetrically disposed about a longitudinal axis of the nozzle;

    characterized in that the cross-sectional area of the central bore decreases between pairs of discharge outlets, and wherein the ratio of height to width of any outlet is one or less.

2. The submerged entry nozzle of claim 1, characterized in that the width of outlets closer to the closed end of the nozzle have the same width as nozzles further from the closed end of the nozzle.

3. The submerged entry nozzle of claims 1 or 2, characterized in that the total area of all outlets is less than twice the cross-sectional area of the central bore that is perpendicular to the flow of the liquid metal.

4. The submerged entry nozzle of claims 1 to 3, characterized in that the total area of all outlets is at least equal to the cross-sectional area of the central bore that is perpendicular to the flow of the liquid metal.

5. The submerged entry nozzle of claims 1 to 4, characterized in that the nozzle comprises at least two pairs of outlets.

6. The submerged entry nozzle of claims 1 to 5, characterized in that the nozzle comprises three pairs of outlets.

7. The submerged entry nozzle of claims 1 to 6, characterized in that the angle formed between each pair of outlets and the longitudinal axis of the nozzle is between approximately 30 and approximately 105 degrees.

8. The submerged entry nozzle of claims 1 to 7, characterized in that the angle formed between the pair of outlets furthest from the closed end and the longitudinal axis of the nozzle is approximately 90 degrees.

9. The submerged entry nozzle of claims 1 to 8, characterized in that the angle formed between each pair of outlets and the longitudinal axis of the nozzle is approximately 90 degrees.

10. The submerged entry nozzle of claims 1 to 8, characterized in that the angle formed between each pair of outlets and the longitudinal axis of the nozzle is different from the

angle formed between each of the other pairs of outlets and the longitudinal axis of the nozzle.

11. The submerged entry nozzle of claim 6, characterized in that the angle formed between each of the pairs of outlets and the longitudinal axis of the nozzle is approximately 60 degrees, 75 degrees and 90 degrees, respectively.

12. The submerged nozzle of claim 1, characterized in that the cross-sectional area of the central bore is not decreased around the entire circumference of the central bore.

13. The submerged nozzle of claim 12, characterized in that the cross-sectional area of the central bore is not decreased in a radial direction that is perpendicular to the radial direction of the outlets.

14. The submerged nozzle of claim 13, characterized in that the cross-sectional area of the central bore is not decreased continuously in a radial direction that is perpendicular to the radial direction of the outlets.

15. A submerged entry nozzle for use in the continuous casting of liquid metal, the nozzle comprising:

c) a body having a central bore through most of the body, the bore terminating in a closed end;

d) a plurality of pairs of discharge outlets symmetrically disposed about a longitudinal axis of the nozzle;

characterized in that the cross-sectional area of the central bore decreases between pairs of discharge outlets, and wherein the width of outlets closer to the closed end of the nozzle have the same width as nozzles further from the closed end of the nozzle.

16. The submerged entry nozzle of claim 15, characterized in that the total area of all outlets is less than twice the cross-sectional area of the central bore that is perpendicular to the flow of the liquid metal.

17. The submerged entry nozzle of claims 15 or 16, characterized in that the total area of all outlets is at least equal to the cross-sectional area of the central bore that is perpendicular to the flow of the liquid metal.

18. The submerged entry nozzle of claims 15 to 17, characterized in that the nozzle comprises at least two pairs of outlets.

19. The submerged entry nozzle of claims 15 to 18, characterized in that the nozzle comprises three pairs of outlets.

20. The submerged entry nozzle of claims 15 to 19, characterized in that the angle formed between each pair of outlets and the longitudinal axis of the nozzle is between approximately 30 and approximately 105 degrees.

21. The submerged entry nozzle of claims 15 to 20, characterized in that the angle formed between the pair of outlets furthest from the closed end and the longitudinal axis of the nozzle is approximately 90 degrees.

22. The submerged entry nozzle of claims15 to 21, characterized in that the angle formed between each pair of outlets and the longitudinal axis of the nozzle is approximately 90 degrees.

23. The submerged entry nozzle of claims 15 to 22, characterized in that the angle formed between each pair of outlets and the longitudinal axis of the nozzle is different from the angle formed between each of the other pairs of outlets and the longitudinal axis of the nozzle.

24. The submerged entry nozzle of claim 20, characterized in that the angle formed between each of the pairs of outlets and the longitudinal axis of the nozzle is approximately 60 degrees, 75 degrees and 90 degrees, respectively.

25. The submerged nozzle of claim 15, characterized in that the cross-sectional area of the central bore is not decreased around the entire circumference of the central bore.

26. The submerged nozzle of claim 25, characterized in that the cross-sectional area of the central bore is not decreased in a radial direction that is perpendicular to the radial direction of the outlets.

27. The submerged nozzle of claim 25, characterized in that the cross-sectional area of the central bore is not decreased continuously in a radial direction that is perpendicular to the radial direction of the outlets.